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little of the fossil forms of this type to form a final opinion as to whether, in view of the relations of the fossil forms, the family Mitsukurinidæ can be maintained.

D. S. J.

The Lateral Line of the Toadfish.—Miss Cornelia M. Clapp, professor of zoölogy in Mount Holyoke College, presents as a doctor's thesis in the University of Chicago a careful study of "The Lateral Line System of *Batrachus tau*."

Dr. Clapp concludes that the lateral line represents an organ of special sense. "The ear seems like a connecting link between the system of lateral line organs from which it has probably originated and the most highly sensory structure in Vertebrata—the eye. Ayers has shown that the auditory organ is in reality a series of canal organs innervated by two distinct cranial nerves." It seems certain that a more thorough knowledge of the changes in these cutaneous sense organs found in fishes and in the embryonic stages of higher types is essential to the understanding of the nervous system itself as developed in higher forms.

It may be noticed that the proper name of our toadfish is *Opsanus tau*, not *Batrachus tau*. The name *Batrachus* was applied by Bloch and Schneider in 1801 to the scaly toadfishes of the tropics, which had still earlier received from Lacépède the name *Batrachoides*. The name is not, therefore, available for any other genus, and the second name in date, the first ever given to the type in question, must be chosen. This is Rafinesque's *Opsanus*.

D. S. J.

Greene on the Lateral Line of the California Toadfish.—In the *Journal of Morphology*, Dr. Charles Wilson Greene, of Stanford University, has an elaborate study of the complex lateral line of another species of toadfish, *Porichthys notatus*, of the California coast. This species has several lateral lines, each of the most complex character, far more specialized than in the common toadfish. The pores in the genus *Porichthys* are accompanied by round shining bodies resembling the luminous spots in certain deep-sea forms, as *Sternoptyx* and *Myctophum*. In *Porichthys* the shining bodies are not known to be self-luminous, and their origin is plainly in the lateral line. The other genera are not related to *Porichthys*, and in them the luminous spots are not outgrowths from the lateral canal system.

Dr. Greene makes no attempt to discuss the homology or significance of the lateral line. Too few forms have yet been studied to make such discussion conclusive. He gives a full account of the

anatomy of the shining bodies in Porichthys. He concludes that these are true phosphorescent organs.

Thus far no specimens have been found to be luminous in the aquarium, and light has not been developed through electric stimulation, or by excitement through ammonia.

D. S. J.

Absence of Retinal Pigment in the Dogfish.—In his study of the retina of the common dogfish (*Mustelus vulgaris*) Schaper¹ has made the noteworthy observation that the retinal pigment cells, which in most vertebrates are loaded with dark pigment granules, are in this animal absolutely devoid of such particles.

P.

Pupa-Grafting in Moths.—The method of grafting young animals, as devised by Born for tadpoles, has been applied by Crampton² to the pupæ of moths. An injured pupa at best regenerates sufficient integument to cover the wound. Parts of two longitudinally split pupæ joined in natural proportions failed to unite, but anterior and posterior portions cut at any level united. Compounds slightly smaller than normal or enlarged by the insertion of a ring failed to coalesce. Fragments grafted on whole pupæ formed exactly those portions they would have formed had they remained on the original pupa. Pupæ are easily united sidewise or endwise, but in these, as in all other cases, the union is that of the integument and superficial parts only. The results of these experiments on the colors of different species are especially interesting. When individuals of two species having different colors were united so that their hæmolympths mingled, the outcome was almost always a double animal whose colors were normal. The same result was obtained from united males and females in species with differently colored sexes. The colors are probably produced, as a rule, through the action on the hæmolympth of a localized internal factor such as the "ferment" cytoplasm assumed by Mayer.

P.

Amitotic Followed by Mitotic Cell Division.—The observations of Gerassimoff, that cooling would convert the mitotic division of Spirogyra cells into amitotic, and of Pfeffer and Nathanson, that a

¹ Schaper, A. Die nervösen Elemente der Selachier-Retina in Methylenblau-präparaten, *Festschrift zum siebenzigsten Geburtstag von Carl von Kupffer*, 10 pp., 3 Taf. Jena, 1899.

² Crampton, H. E. An Experimental Study upon Lepidoptera, *Archiv für Entw.-mech.*, Bd. ix, pp. 293-318, Pls. XI-XIII, 1899.